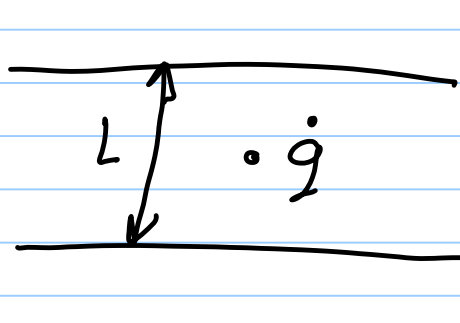


نام خدا

صلبه (هم) جزیی بدیده لای انتقال

حالت سوم : فریب هدایت واری ثابت و انتقال واریت همراه با تویس واریت



$$-k \left(\frac{dT}{dy} \right)_y - \left(-k \left(\frac{dT}{dy} \right)_{y+dy} \right) + \dot{q} dy = 0$$

$$\begin{cases} y=0 & T=T_0 \\ y=L & T=T_1 \end{cases}$$

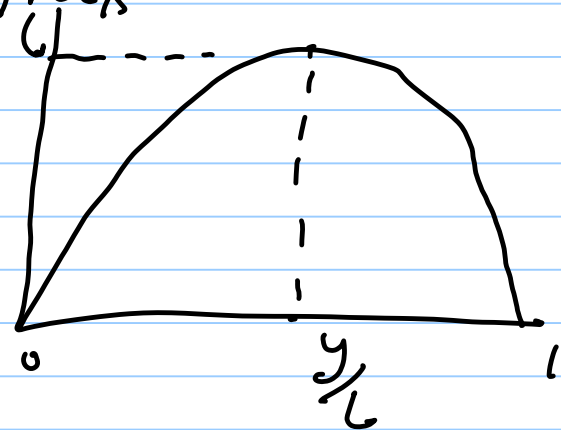
$$k \frac{dT}{dy} + \dot{q} = 0$$

$$\frac{d^r T}{dy^r} = -\frac{\dot{q}}{K} \Rightarrow \frac{dT}{dy} = -\frac{\dot{q}}{K} y + A_1 \Rightarrow T = -\frac{\dot{q}}{2K} y^r + A_1 y + A_2$$

$$T = T_0 = \dots + A_2 \Rightarrow \boxed{A_2 = T_0} \quad T = -\frac{\dot{q}}{2K} y^r + A_1 y + T_0$$

$$T = T_0 = -\frac{\dot{q}}{2K} l^r + A_1 l + T_0 \Rightarrow A_1 = ? \quad T_{\max}$$

$$\boxed{T = T_0 + \frac{\dot{q} l^r}{2K} \left[\frac{y}{l} - \left(\frac{y}{l} \right)^r \right]}$$



$$y = l/2 \Rightarrow T_{\max} = T_0 + \frac{\dot{q} l^r}{2K}$$

$y=l$ ————— T_L حالت % رطوبت: ضریب هوابندی متغیر باشد.

$$K = k \cdot f(T)$$

$y=0$ ————— T_0

$$\frac{d}{dy} \left(k \frac{dT}{dy} \right) = 0 = \frac{d}{dy} \left(k \cdot f(T) \frac{dT}{dy} \right) = 0$$

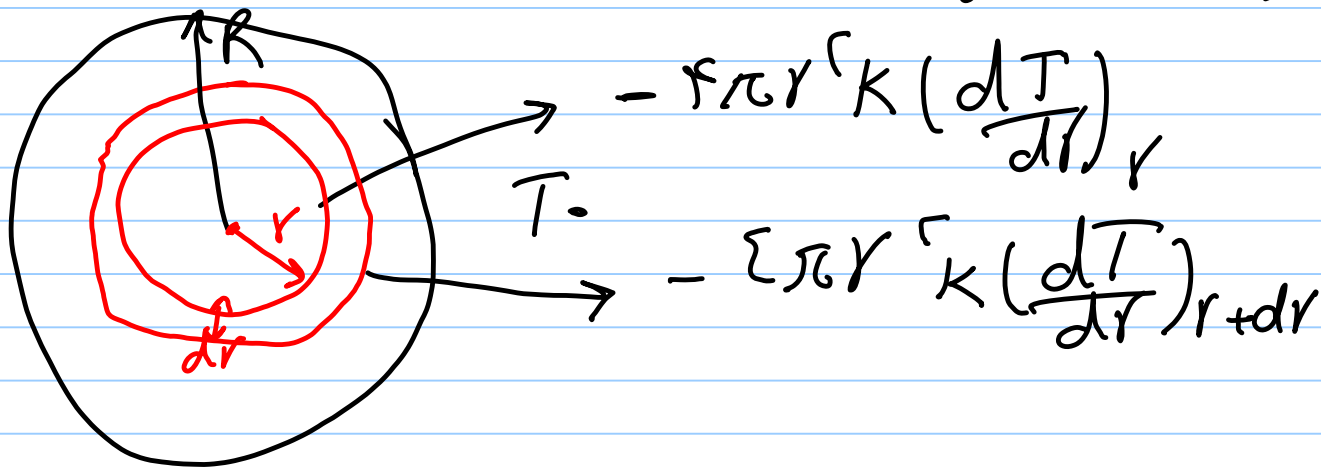
$$k \cdot f(T) \frac{dT}{dy} = A_1 = -q_v \rightarrow \text{سویچ های صاف}$$

$$k \cdot f(T) dT = -q_v dy \Rightarrow k \cdot \int_{T_0}^{T_L} f(T) dT = - \int_0^l q_v dy$$

$$k_0 \int_{T_0}^{T_L} f(T) dT = -q_v y \Big|_0^L = -q_v L \Rightarrow q_v = \frac{-k_0}{L} \int_{T_0}^{T_L} f(T) dT$$

هدایت داری در جسم کره ای با توده داری :

کره به نفاذ R ، ضریب هدایت داری k ، رسانایی \dot{q} ، $T = T_0 \leftarrow r = R$



$$\left[-\epsilon r^{\Gamma} k \left(\frac{dT}{dr} \right) \right]_r + \left[\epsilon r^{\Gamma} k \left(\frac{dT}{dr} \right) \right]_{r+dr} + \dot{q} \epsilon r^{\Gamma} dr = 0$$

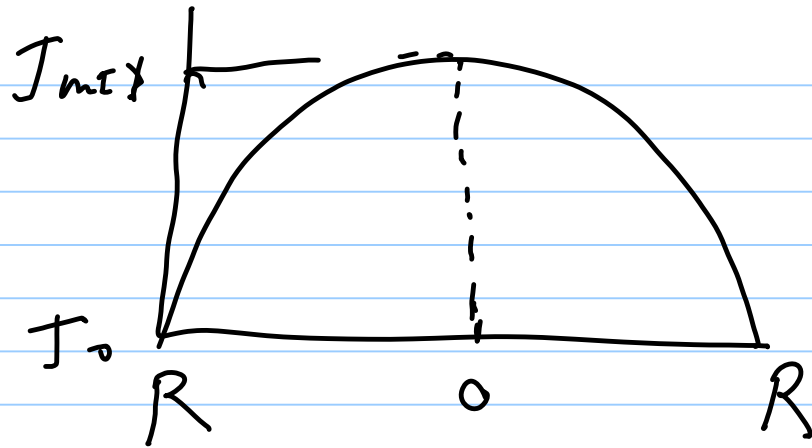
$$\frac{1}{r^{\Gamma}} \frac{d}{dr} \left(r^{\Gamma} k \frac{dT}{dr} \right) + \dot{q} = 0$$

$$\begin{cases} r = R \\ T = T_0 \end{cases}$$

$$T = - \frac{\dot{q} r^{\Gamma}}{4k} + \frac{A_1}{r} + A_2$$

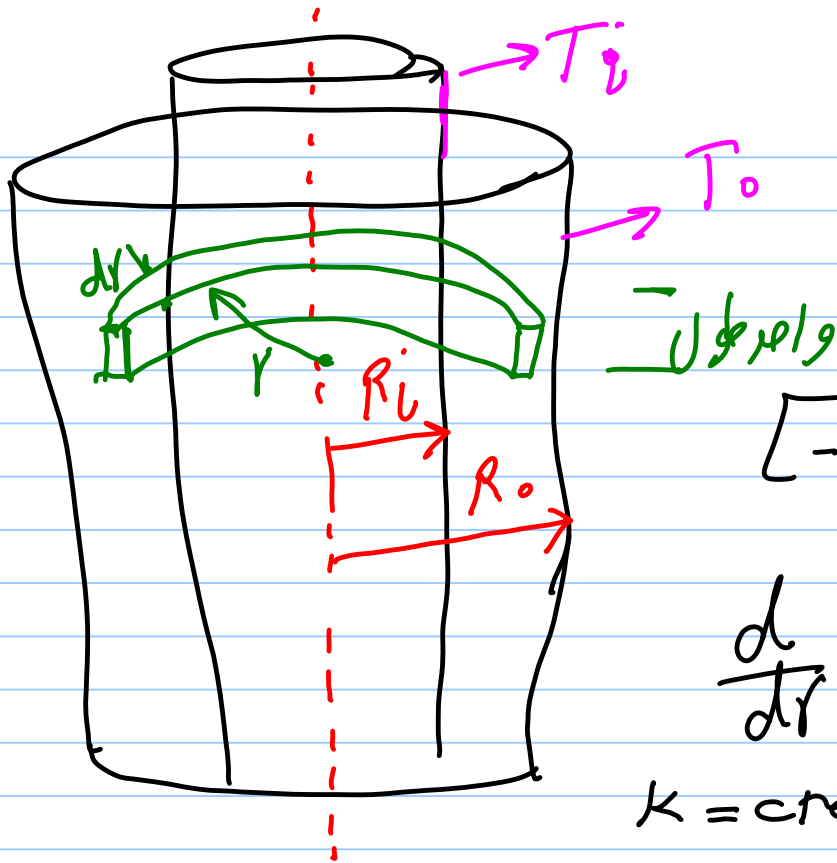
$$A_1 = 0$$

$$T = - \frac{\dot{q} r^{\Gamma}}{4k} + A_2 \Rightarrow T = T_0 + \frac{\dot{q}}{4k} (R^{\Gamma} - r^{\Gamma})$$



$$T_{max} = T_0 + \frac{g}{4k} R^2$$

هوای بارانی در آسمان نوظاهل:



رمان سیال داخل لوله T_i
 عایق دور لوله به ضریب هدایت k واری k

$$\left[-k r \pi r \left(\frac{dT}{dr} \right) \right]_r + \left[k r \pi r \left(\frac{dT}{dr} \right) \right]_{r+dr} = 0$$

$$\frac{d}{dr} \left[k r \frac{dT}{dr} \right] = 0$$

$$k = \text{const} \Rightarrow \frac{d}{dr} \left[r \frac{dT}{dr} \right] = 0$$

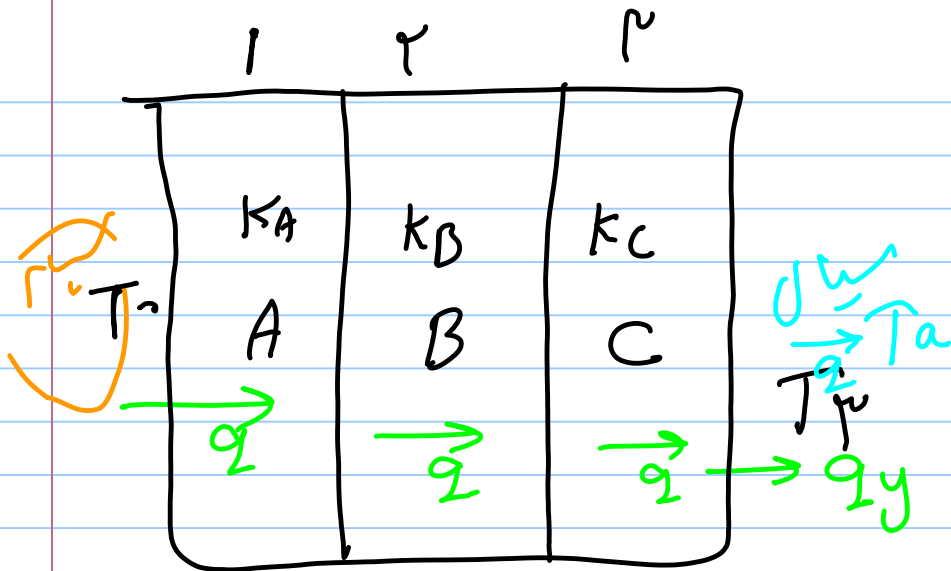
$$r \frac{dT}{dr} = A_r \Rightarrow \frac{dT}{dr} = \frac{A_c}{r} \Rightarrow T = A_1 + A_c \ln r$$

$$\text{B.C.} \begin{cases} r = R_i & T = T_i & T_i = A_1 + A_c \ln R_i \\ r = R_o & T = T_o & T_o = A_1 + A_c \ln R_o \end{cases}$$

$$T = \frac{T_i \ln \frac{R_o}{r} - T_o \ln \frac{R_i}{r}}{\ln \frac{R_o}{R_i}}$$

$$Q = -\gamma \pi r K \frac{dT}{dr} \Rightarrow Q = \frac{\gamma \pi K (T_i - T_o)}{\ln \frac{R_o}{R_i}}$$

هندسه حرارت در یک رابط جنه لایه



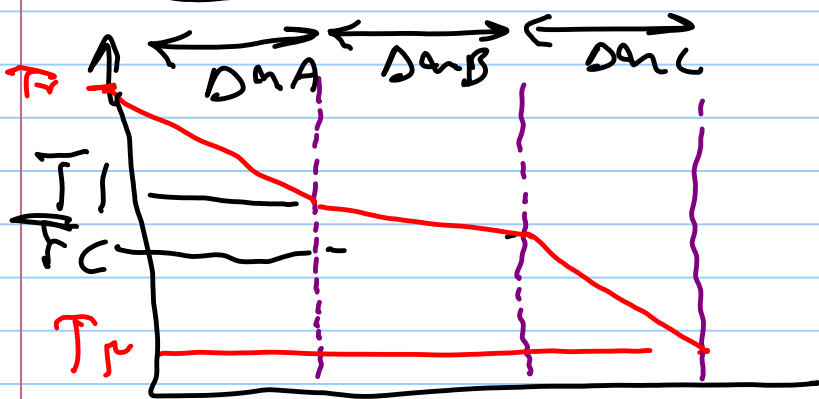
$$q_y = k_A \frac{T_0 - T_1}{\Delta x_A} = k_B \frac{T_1 - T_C}{\Delta x_B} = k_C \frac{T_C - T_\infty}{\Delta x_C}$$

$$T_0 - T_1 = \frac{q_y \Delta x_A}{k_A} \quad T_1 - T_C = \frac{q_y \Delta x_B}{k_B}$$

$$T_2 - T_\infty = \frac{q_y \Delta x_C}{k_C}$$

$$q_y = h_a (T_\infty - T_a)$$

$$T_\infty - T_a = \frac{q_y}{h_a}$$



$$T_0 - \cancel{T_1} + \cancel{T_1} - \cancel{T_c} + \cancel{T_c} - T_r = \overset{+T_r - T_a}{2y \frac{\Delta n_A}{k_A}} + 2y \frac{\Delta n_B}{k_B} + 2y \frac{\Delta n_C}{k_C} + \frac{2y}{h_a} + \frac{2y}{h_b}$$

$$T_0 - T_r = 2y \left(\frac{\Delta n_A}{k_A} + \frac{\Delta n_B}{k_B} + \frac{\Delta n_C}{k_C} \right) + \frac{1}{h_a} + \frac{1}{h_b}$$

$$\boxed{2y = \frac{T_0 - T_r}{\frac{\Delta n_A}{k_A} + \frac{\Delta n_B}{k_B} + \frac{\Delta n_C}{k_C} + \frac{1}{h_a} + \frac{1}{h_b}}}$$